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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/591,941

09/08/2006

Kouichi Ichiki

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EXAMINER

KRUPICKA, ADAM C

ART UNIT

PAPER NUMBER

1794

NOTIFICATION DATE

DELIVERY MODE

07/14/2009

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/591,941	<b>Applicant(s)</b> ICHIKI, KOUICHI	
	<b>Examiner</b> Adam C. Krupicka	<b>Art Unit</b> 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 08 September 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☒ Claim(s) 1-10 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 September 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>09/08/2006</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Information Disclosure Statement***

The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered. Of particular note, the Shinano Mainichi Shimbun published on September 2, Heisei 15 (2003) is described at the bottom of page 1 in the Background Art as being pertinent to the subject matter of the present application. However, the reference has not been received and was not obtainable by the Examiner.

### ***Specification***

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract of the disclosure is objected to because it is not written as a single paragraph. Correction is required. See MPEP § 608.01(b).

### ***Claim Objections***

Claims 1-10 are objected to because of the following informalities: the claims fail to separate each element or step by line indentation for clarity. Appropriate correction is required. Where a claim sets forth a plurality of elements or steps, each element or step of the claim should be separated by a line indentation. 37 CFR 1.75(i), MPEP 608.01(m).

### ***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 5 is rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd. App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**Claims 5 and 7** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

**Regarding applicants' claim 5**, it is unclear what applicants regard as their invention, as the instant claim fails to recite any positive/active process steps. It is unclear as to what steps are required to form the product. It is noted that process claims should recite active language such as folding, mixing, blending, etc.. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

**Regarding applicants' claim 7**, the term "difficult" is considered to be a relative term which renders the claim indefinite and which is not defined by the claim. Further the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1-9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Mori (US Pat. 6,132,487) in view of Arai *et al.* (*Carbon nanofiber-copper composite powder prepared by electrodeposition, Electrochemistry Communications* 5 (2003) 797-799).

**Regarding applicants' claims 1 and 2**, Mori teaches the manufacture of electrical devices and mechanical components by sintering a mix of compressed powdered bismuth and powdered copper (*considered to form a composite metal article with two kinds of metal formed at random, col. 2 lines 16-31 and Embodiment 1, col. 4 lines 55-67*). Mori does not appear to explicitly teach carbon nanotubes being dispersed and incorporated in at least one side of each metal in the composite. However Arai *et al.* teach a carbon nanotube-copper composite powder formed by electrodeposition that is useful in powder metallurgy applications, and where the carbon nanotubes are utilized for their excellent mechanical strength and good electroconductivity (*page 1 including introductions and Experimental - first paragraph and figure 1 f*). One of ordinary skill in the art at the time of the invention would have found it obvious to use the carbon nanotube-copper composite powder as the copper powder in the sintered compact of Mori in order to increase the mechanical and electrical properties of the sintered compact, thereby increasing the mechanical and electrical properties of the resulting electrical devices and mechanical components.

It is further noted that during sintering the bismuth is raised above its melting temperature while the copper is not. This is considered to cause the bismuth to fill throughout the compact and around the carbon nanotubes which partially protrude from the copper, thereby forming a two metal composite where the carbon nanotubes are

incorporated into both the copper (*during formation of the powder*) and the bismuth (*during sintering*).

**Regarding applicants' claim 3**, the composite particles of Arai *et al.* are formed by distribution of carbon nanotubes in a plating bath contained in a commercially available electrolytic cell having a copper substrate and a copper phosphours anode (*considered to be formed by passing an electric current between a cathode and an anode immersed in an electrolytic solution, Experimental section - pages 1 and 2*).

Arai *et al.* disclose the formation of the composite particles to be by an electrolytic process suggesting the claimed product is the same as what is taught by the prior art. Further, it is noted that “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior art product was made by a different process”, *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Further, “the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product”, *In re Marosi*, 710 F.2d 798, 802, 218 USPQ 298, 292 (Fed Cir. 1983). See MPEP 2113.

**Regarding applicants' claim 4**, Mori and Arai *et al.* do appear to explicitly disclose the formation of the composite particles to be by an oxidation-reduction process. However, the above arguments establish a rationale tending to show the

claimed product is the same as what is taught by the prior art. It is noted that “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior art product was made by a different process”, *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Further, “the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product”, *In re Marosi*, 710 F.2d 798, 802, 218 USPQ 298, 292 (Fed Cir. 1983). See MPEP 2113.

**Regarding applicants’ claim 5**, it does not appear applicants have set forth any active process limitations. Since the product of Mori and Arai *et al.* meets the product limitations of the instant claim as set forth above, it is clear that it must be made by a production method and therefore must meet the limitations set forth by the instant claim.

**Regarding applicants’ claims 6 and 7**, Mori and Arai *et al.* teach a mix of powdered bismuth and carbon nanotube-copper composite powder which is compressed into a compact (*considered to form a porous body*). The compact is then sintered at 700°C which is considered to melt the bismuth and impregnate the compact (*Embodiment 1, col. 4 lines 55-67*). Here “impregnate” is taken to mean to infuse or fill completely. During sintering the bismuth is raised above its melting temperature which is considered to cause a flow of bismuth throughout the spaces between the carbon



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nanotube-copper composite powder thereby filling the porous space formed during compression of the mixed powders.

Regarding the term “difficult”, the examiner considers the copper of which the composite particles are formed to be electroplatable, but may be considered “difficult” to electroplate depending on the apparatus used, the complexity of the plating bath, the size of the article, or particles being formed.

**Regarding applicants’ claim 8**, Mori does not appear to explicitly disclose the temperature at which the mixed powders are compressed. However, it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the temperature for the intended application, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In the present case, one of ordinary skill in the art would recognize the use of raised temperatures in the formation of a stronger compacts affect the strength through bonding when compressed. Thus temperature is a result effective variable. It would have been obvious for one of ordinary skill in the art at the time of the invention to compress the powders at an elevated temperature in order to form a stronger compact prior to sintering.

**Regarding applicants’ claim 9**, the composite particles of Arai *et al.* are formed by distribution of carbon nanotubes in a plating bath contained in an commercially available electrolytic cell having a copper substrate and a copper phosphours anode (*considered to be formed by passing an electric current between a cathode and an anode immersed in an electrolytic solution, Experimental section - pages 1 and 2*).

**Claim 10** is rejected under 35 U.S.C. 103(a) as being unpatentable over Mori, in view of Arai *et al.* further in view of Douglas *et al.* (US Pat. 4,023,961).

Mori and Arai *et al.* teach a sintered compact of mixed carbon nanotube-copper powder and powdered bismuth as shown above but do not appear to explicitly teach the carbon nanotube-copper composite powder to be formed by an oxidation-reduction process.

However Douglas *et al.* teach the formation of a powdered material by providing a metal or metal oxide in solution which is atomized and sprayed in a reducing agent (*abstract and col. 3 line 6 - col. 4 line 10*). Douglas *et al.* further note that addition of other materials to the atomized spray to provide further beneficial characteristics (*col. 10 lines 22-34*). It is known from Arai *et al.* that carbon nanotubes may be including in a solution from which the composite particles are to be formed. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to introduce the carbon nanotubes in the metal solution of Douglas *et al.* in order to form the composite metal nano-particles by a known alternative powder forming method that provides greater versatility and relative ease when compared with other powder producing methods (*col. 10 lines 22-34*).

### **Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Adam C. Krupicka whose telephone number is

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(571)270-7086. The examiner can normally be reached on Monday - Thursday 7:30am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Adam C Krupicka/  
Examiner, Art Unit 1794

/Aaron S Austin/  
Examiner, Art Unit 1794